



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : KUTSUNA, Takaaki, et al.

Serial No. : 10/015,564

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For : COMPOSITION FOR COATING HAVING A GAS  
BARRIER PROPERTY, COATING AND COATED  
FILM HAVING A GAS BARRIER POROPERTY USED  
THE SAME

D E C L A R A T I O N

Honorable Commissioner of

Patent & Trademarks

Washington, D.C. 20231

I, Shuta KIHARA, Japanese citizen, residing at c/o  
Mitsubishi Gas Chemical Company Inc., Hiratsuka Research  
Laboratory 6-2, Higashiyawata, 5-chome, Hiratsuka-shi,  
Kanagawa, Japan,

Declare:

That I am an inventor of the above application, and  
familiar with the invention and prosecution history of said  
application;

I performed the following experiments to

demonstrate that when an amine curing agent C' obtained from a uniform mixture of fatty amine compound (B) disclosed in Japanese Patent Publication No.08-104738A and the amine curing agent C (a reaction product of metaxylenediamine and methyl acrylate) described on pages 30 to 31 of the specification is used for preparation coated film, the gas barrier property of the coated film thus obtained deteriorates and is inferior to that of a coated film prepared using only amine curing agent C (page 30 to 31 of the specification).

(1) Experimental data were added to Example 3 on page 37 of the specification wherein 57 parts by weight of amine curing agent C (pages 30 to 31 of the specification) was used as a curing agent.

(2) The Experiment of Comparative Example 9 wherein the coated films were prepared in the same manner as in Example 3 of the specification except that amine curing agent C' obtained from a uniform mixture of 2 parts by weight of n-hexadecylamine (corresponding to fatty amine compound (B) disclosed in Japanese Patent Publication No.08-104738A) and 98 parts by weight of amine curing agent C (pages 30 to 31 of the specification) was used instead of amine curing agent C in Example 3 was conducted.

### Experiments

#### Example 3

A MFG solution containing 57 parts by weight of amine curing agent C (pages 30 to 31 of the specification) and 50 parts by weight of an epoxy resin with tetraglycidylamine moiety derived from metaxylylenediamine, manufactured by Mitsubishi Gas Chemical Co., Inc., TETRA-X was prepared and 0.02 parts by weight of an acrylic wetting agent, manufactured by Big Chemi Co., BYK381 was added thereto and stirring was sufficiently performed, whereby a coating solution was prepared. The coating solution thus obtained was coated on each base material and curing reaction was performed at 60°C for one hour and then further at 120°C for 30 minutes, whereby coated films were prepared on each base material. Oxygen permeation factor and oxygen permeability for the coated films thus obtained were again evaluated. The oxygen permeation factor was 0.033 cc·mm/(m<sup>2</sup> · day · atm) and the oxygen permeability (thickness 4 μ m) was 8.3 cc/(m<sup>2</sup> · day · atm).

#### Comparative Example 9

2 parts by weight of n-hexadecylamine (Product No.07192-12, a reagent for research, manufactured by Kanto Chemical Co., Ltd, in Japan) was mixed with 98 parts by weight of amine curing agent C (page 30 to 31 of the specification) and a mixture thus obtained was maintained to a uniform state with heating and cooled to a room temperature, whereby amine curing agent C' was prepared.

A MFG solution containing 57 parts by weight of

amine curing agent C' and 50 parts by weight of an epoxy resin with tetraglycidylamine moiety derived from metaxylylenediamine, manufactured by Mitsubishi Gas Chemical Co., Inc., TETRAD-X was prepared and 0.02 parts by weight of an acrylic wetting agent, manufactured by BYK · Chemi GmbH, BYK381 was added thereto and stirring was sufficiently performed, whereby a coating solution was prepared. The coating solution thus obtained was coated on a base material (polyethylene terephthalate film, 100  $\mu$  m) and curing reaction was performed at 60°C for one hour and then further at 120°C for 30 minutes, whereby a coated film was prepared on the base material. Oxygen permeation factor and oxygen permeability for the coated film thus obtained were evaluated. The oxygen permeation factor was 0.048 cc·mm/(m<sup>2</sup> · day · atm) and the oxygen permeability (thickness 4  $\mu$  m) was 12.0 cc/(m<sup>2</sup> · day · atm).

### Conclusion

In comparison between Example 3 and Comparative Example 9, the gas barrier property of coated film prepared using amine curing agent C' deteriorates and is inferior to that of coated film prepared using only amine curing agent C (page 30 to 31 of the specification).

The undersigned declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this day of April 9 2007

Shuta Kihara

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